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EXAMINER
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UNDERDAHL, THANE E

ART UNIT	PAPER NUMBER
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1651

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11/26/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/738,378	<b>Applicant(s)</b> VICINAY ET AL.	
	<b>Examiner</b> THANE UNDERDAHL	<b>Art Unit</b> 1651	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) 33,35,38 and 40-44 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32, 34, 36, 37, 39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### Detailed Action

This Office Action is in response to the Applicant's reply received 5/9/08. Claims 1-44 are pending. Claims 33, 35, 38, 40-44 are withdrawn. No claims are cancelled. Claim 1 has been amended. No claims are new.

### **New Rejections Necessitated by Applicant's Amendment**

Applicant's amendment to claim 1 must be address before the arguments to the 103 rejections can be considered. Here is a summary of the abbreviations used by the Examiner in the previous Office Actions as well as those in this Office action:

- 4GPX = 4-O- $\beta$ -D-glactopyranosyl-D-xylose
- 3GPX = 3-O- $\beta$ -D-glactopyranosyl-D-xylose
- 2GPX = 2-O- $\beta$ -D-glactopyranosyl-D-xylose

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 and dependant claims 2-32, 34, 36, 37, and 39 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Claim 1 contains the limitation "producing 4-O- $\beta$ -D-glactopyranosyl-D-xylose... in an amount at least 68% to 32% proportional to the amount of 2-O- $\beta$ -D-glactopyranosyl-D-xylose and 3-O- $\beta$ -D-glactopyranosyl-D-xylose" is indefinite because it does not

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clearly define the units of the percentages. It is unclear if the claim is referring to percent ratios of weight/weight or mole/mole, volume/volume, weight/volume etc.

Clarification is required.

Also the phrase “in an amount at least 68% to 32% proportional to the amount of 2-O-β-D-glactopyranosyl-D-xylose and 3-O-β-D-glactopyranosyl-D-xylose” is indefinite because it is contradictory since “at least 68% to 32%” contains open and closed language in the same limitation. It is unclear if the range should be “at least 32%” which would include all values up to 100% even those above the limitation of 68% or “at least 68%” which would exclude the values lower such as 32%.

Also this limitation is unclear because of the limitation that the “4-O-β-D-glactopyranosyl-D-xylose [is]...in an amount at least 68% to 32% proportional to the amount of 2-O-β-D-glactopyranosyl-D-xylose and 3-O-β-D-glactopyranosyl-D-xylose”. The term “proportional” is confusing in this context since it is unclear how the proportions of 4GPX are related to 2GPX and 3GPX. It is unclear what proportionality constant is being applied to the three sugars. For example, if 4GPX is at least 68% does that inherently mean the percentage of the other two sugars are at least 32%. Or in the alternative, are the values of at least 68% to 32% a proportionality constant or ratio between 4GPX and the other sugars as in the following formula:

$$\frac{4\text{GPX}}{3\text{GPX} + 2\text{GPX}} = 68\%$$

Clarification is required to remove this rejection.

In the interest of compact prosecution the Examiner interprets the claim to read on any ratio or proportion of these sugars.

### **Response to Applicant's Arguments**

The Examiner has noted the Applicant's review of the European prosecution of this Application. However, the Examiner is bound to US practice which is not completely congruent with European practice when prosecuting patent applications.

In the response submitted by the Applicant, the 35 U.S.C § 103 (a) rejection of claims 1, 2, 3, 4, 21-24, 27-32, 34, 36, 37, and 39 over Reyes et al., in view of Ponpipom et al., and Crumpton et al. as supported by Chemindustry.com and Schippers et al. were considered but not found persuasive.

The Applicant argues that the steps (v) and (vi) of the method are not taught directly by the above references. However steps (v) and (vi) were present in the previous Office Action and were found to be obvious by combining the above references.

The Applicant further argues that a prima facie case made by the Examiner is overcome by the unexpected results of "such a high yield of 4-O- $\beta$ -D-glactopyranosyl-D-xylose in proportion to the 2-O- $\beta$ -D-glactopyranosyl-D-xylose and 3-O- $\beta$ -D-glactopyranosyl-D-xylose"(Applicant's Response, Pg 12, lines 1 and 2). The Examiner does agree, but as stated in M.P.E.P. § 716.02(d) unexpected results must be commensurate with the scope of the claim. While the Examiner believes that the

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current amendment to the claims is an attempt to bring the claims inside the scope of these unexpected results, the issues of indefiniteness detailed above preclude this Application to from being free of the art and allowance. Therefore in-light of the Examiners interpretation of the amended claims the rejection stands since Reyes et al. does teach the enzymatic preparation of a ratio of 4GPX, 2GPX, 3GPX of 8.6:1.4:1.0 (Reyes, Col 5, line 9) using a column of activated carbon and a water/ethanol gradient (Reyes, col 5, line 4 and 5). This corresponds to a proportion (using the formula presented in the USC 112 2nd Rejection) of 358% which is greater than at least 68% or a Ratio of 4GPX to the other sugars of 4.3:1.2. Therefore this rejection stands and is repeated below.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 4, 21-24, 27-32, 34, 36, 37, 39 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Reyes et al (U.S. Patent # 5, 994, 092) in view of Ponpipom et al. (U.S. Patent # 4, 228,274), and Crumpton et al. (Biochem J. 70(4) 1958, page 729) as supported by Chemindustry.com ([www.chemindustry.com](http://www.chemindustry.com)) in light of additional support by Schippers et al. (Analytical Chem, 1981).

These claims are drawn to a method of production of 4-O- $\beta$ -D-galactopyranosyl-D-xylose and purification from an enzymatic reaction between  $\sigma$ -nitrophenyl-  $\beta$ -galactopyranoside and xylose with  $\beta$ -galactosidase acting as the catalyst.

The patent of Reyes et al. teach a method for the preparation of 4-O- $\beta$ -D-galactopyranosyl-D-xylose (4GPX) (See example 1, col 4). This method adds  $\sigma$ -nitrophenyl- $\beta$ -galactopyranoside to xylose in buffered water at pH=7 with  $\beta$ -galactosidase from *E. coli* into a reaction mixture. The reaction mix is incubated for 5 hours and 45 mins at 25 °C. After that time the reaction is heated to 100°C for 10 mins and concentrated before being filtered on an activated carbon column with a water/ethanol gradient. This gradient isolates the 4-O- $\beta$ -D-galactopyranosyl-D-xylose.

Claims 22-24 pertain to the amounts of D-xylose (claim 22),  $\beta$ -galactopyranoside (claim 23) and  $\beta$ -galactosidase (claim 24) added to the reaction solution. Reyes et al. already discusses the addition of these components in Example 1 in their patent (col 4 to col 5). Slight adjustments to the concentrations of the reaction mixture are rendered obvious in the absence of unexpected results or teachings of criticality since one of ordinary skill in the art would routinely optimize the reaction based on efficient use of enzyme and substrates to improve the cost to yield ratio.

Claims 27-31 pertain to the temperature conditions for the reaction of claim 1, which includes the following temperature ranges: constant temperature (claim 27), -5 °C to 40 °C (claim 28), lower than 0 °C (claim 29), -5 °C (claim 30), room temperature (claim 31). Reyes et al. teach in Example 1 of their patent (col 4 to col 5) that the reaction can be performed at constant room temperature (25 °C). One of ordinary skill in

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the art would recognize that the hydrolysis of the substrate,  $\sigma$ -nitrophenyl- $\beta$ -galactopyranoside by  $\beta$ -galactosidase will occur at any temperature in which the enzyme is active. This same artisan would also understand that the decrease of temperature will adjust the reaction rate. Therefore base on the time allotted for the reaction (i.e. performing the reaction overnight or over the lunch hour) one of ordinary skill in the art, through routine optimization would adjust the temperature accordingly.

Reyes et al. does not teach the crystallization of 4GPX. However crystallization is a common procedure for the purification of saccharides as taught by Ponpipom et al. who crystallized glycopyranosides in either cold water or acetone (col 3, line 50). Ponpipom et al. also teach that it is also possible to crystallize other glycopyranosides after a filtration step with diatomaceous silica (col 13, line 50) in solvents such as ethanol (col 10, line 68) or 2-propanone (col 13, line 44) or solvent mixtures such as ethyl acetate/ethyl ether (col 12, line 30). Diatomaceous silica is a synonym for Celite as supported by Chemindustry.com. Crumpton et al. teach that a disaccharide can be crystallized with aqueous acetone that is optically pure in CD spectroscopy (Crumpton, page 732, col 2, paragraph 1). Schippers et al. supports that optical purity and chemical purity are in close agreement (Schippers, Experimental section). With all these options available for the crystallization of saccharides, one of ordinary skill in the art would recognized that recrystallization is a common process for the isolation of saccharides and that the selection of solvent or mixture of solvents is a matter of routine optimization that depends on temperature, purity of the solvent and miscibility of the solvent systems used in the crystallization. Absent any teachings of criticality of the solvent selected and



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unexpected results one of ordinary skill in the art would have reasonable expectation of success in crystallizing disaccharides with the current available art. Please see M.P.E.P. § 2144.05 (II) and (KSR International Co. v. Teleflex Inc., 550 U.S.--, 82 USPQ2d 1385 (2007)) for further support.

Therefore the references listed above renders obvious claims 1, 2, 3, 4, 21-24, 27-32, 34, 36, 37, 39.

Applicants rely on the arguments used in traversing the above rejection to also traverse this rejection without additional arguments. However, as explained above, the previous rejection stands. Therefore, the response set forth above to arguments also applies to the following rejections that use Reyes et al. as the primary reference.

In response to the applicant's traversal of the 35 U.S.C § 103 rejection of claims 1, 5, 6, and 16-19 over Reyes et al (U.S. Patent # 5, 994, 092) in view of Ponpipom et al. (U.S. Patent # 4, 228,274), and Crumpton et al. (Biochem J. 70(4) 1958, page 729) as applied above and in further view of Wong-Madden et al. (U.S. Patent # 5,770,405) and Dahmen et al. (U.S. Patent # 4,675,392), the applicants arguments were considered but not found persuasive.

The Applicant argues that since the independent claim is found allowable because of the unexpected results in purity that, in turn, the dependent claims are allowable. However, as cited above this is not the case and the independent claims remain rejected.

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The Applicant argues that Wong-Madden et al. teaches the use of their solvent mixture for silica gel and not active carbon. However, as stated in the action the solvent system of Wong-Madden et al. for the purification of oligosaccharides is very similar to the solvent system used by Reyes et al. that was used to purify sugars on an activated carbon column. The 37 C.F.R. 1.132 declaration discusses the economic and environmental impact of the solvents, but does not address whether either solvent systems will or will not adequately separate oligosaccharides on the activated carbon column. Since Reyes et al. does teach the use of a water/ethanol gradient to elute 4GPX from an activated carbon column and Wong-Madden et al. uses a similar solvent system of water/isopropanol/ethanol on silica gel. One of ordinary skill in the art would recognize from these references that the same solvent systems used for a silica gel column would work for an active carbon column since in the purification of disaccharides. The rationale that the obviousness of this rejection holds is that one of ordinary skill in the art could combine these prior art elements and yield the predictable result (KSR International Co. v. Teleflex Inc., 550 U.S.--, 82 USPQ2d 1385 (2007)).

Therefore the rejection stands and is repeated below.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5, 6, and 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reyes et al (U.S. Patent # 5, 994, 092) in view of Ponpipom et al. (U.S. Patent # 4, 228,274), and Crumpton et al. (Biochem J. 70(4) 1958, page 729) as applied above and in further view of Wong-Madden et al. (U.S. Patent # 5,770,405) and Dahmen et al. (U.S. Patent # 4,675,392).

These claims pertain to a method of isolation of 4GPX via a solid-liquid extraction using a column with an eluent and gradient of water/isopropanol.

Reyes et al., Ponpipom et al., and Crumpton et al. teach the enzyme assisted synthesis and purification via and activated carbon column and crystallization of 4GPX as detailed above.

Reyes et al. does teach the use of a water/ethanol gradient to elute 4GPX from an activated carbon column but not water/isopropanol as limited in claims 5 and 6. However Wong-Madden et al. (U.S. Patent # 5, 770,405) shows that solvent mixes of water/isopropanol/ethanol are suitable for the separation of oligosaccharides (col 12, table 2). It would be obvious to one skilled in the art to replace ethanol in the method of Reyes et al. with isopropanol since Wong-Madden et al. shows that these act as art defined equivalents for the separation of saccharides.

Claims 16-19 discuss the purification of 4GPX on an activated carbon column which is taught by Reyes et al. (Example 1, col 5, line 3) who uses a solvent gradient of water/ethanol to elute 4GPX. As mentioned above Wong-Madden et al. shows that it is obvious to replace the water/ethanol gradient with an isopropanol/water solvent mixture. However neither directly teaches the specifics of the solvent gradient in

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claims 17 nor the amount of activated carbon to use in claim 18. These items are result effective variables optimized by routine experimentation by one or ordinary skilled in the art. The average skilled artisan would recognize that the solvent gradient will depend on the size of the column particles, the length and width of the column as well as the time allotted for the separation. The amount of activated carbon to use will depend on the perceived yield of 4GPX and the loading amounts of reaction mixture the column can bear to separate. Therefore the references listed above renders obvious claims 1, 5, 6, and 16-19.

In response to the Applicant's traversal of the 35 U.S.C § 103 rejection of amended claims 1, 7-15 over Reyes et al (U.S. Patent # 5, 994, 092) in view of Ponpipom et al. (U.S. Patent # 4, 228,274), Crumpton et al. ( Biochem J. 70(4) 1958, page 729) Wong-Madden et al. (U.S. Patent # 5,770,405) and Dahmen et al. (U.S. Patent # 4,675,392) as applied above and in further view of Rao et al. (Qual. Plant. - Pl.Fds.hum.Nutr. XXVIII 4:293-303, 1979) the Applicant's arguments were considered but not found persuasive.

The Applicant argues that since the independent claim is found allowable because of the unexpected results in purity that, in turn, the dependent claims are allowable. However, as cited above this is not the case and the independent claims remain rejected.

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The Applicant argues that one of ordinary skill in the art would not consider using activated carbon to purify low molecular weight sugars in view of the pervading art that supports the use of silica gel. However the art cited by the Examiner shows that using silica gel, activated carbon or soxhlet extractors are used to purify sugars and are elements known in the art to yield the predictable result. Therefore it would remain obvious to use either or a mixture of the elements to isolate sugars since this is simple either a substitution or a combination of prior art elements that will yield the predictable result of a purified sugar (KSR International Co. v. Teleflex Inc., 550 U.S.--, 82 USPQ2d 1385 (2007)). Therefore the rejection stands and is repeated below.

Therefore the following rejection is upheld and is repeated here. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 7-15 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Reyes et al (U.S. Patent # 5, 994, 092) in view of Ponpipom et al. (U.S. Patent # 4, 228,274), Crumpton et al. (Biochem J. 70(4) 1958, page 729) Wong-Madden et al. (U.S. Patent # 5,770,405) and Dahmen et al. (U.S. Patent # 4,675,392) as applied above and in further view of Rao et al. (Qual. Plant.-Pl.Fds.hum.Nutr. XXVIII 4:293-303, 1979).

These claims pertain to the method of extracting the 4GPX with celite and a Soxhlet extractor.

Claim 7 depends from claim 1 and limits the additional purification of the disaccharide to include the addition of celite and to the reaction mixture and extraction of the disaccharide with a Soxhlet extractor. Neither of these are taught by Reyes et al. However, the use of Soxhlet extractors and celite are known in the art as methods to purify saccharides as taught by Rao et al. (page 294, 3<sup>rd</sup> paragraph and 295 1<sup>st</sup> paragraph respectively) as well as previously mentions by Ponpipom et al. above. Rao et al. also uses a non-polar/polar solvent mix of chloroform and methanol. However one of ordinary skill in the art would recognize that the main requirement for a solvent for Soxhlet extraction is that the compound be soluble in the hot solvent. It would be obvious to one skilled in the art to select other solvents or solvent mixes, known to dissolve saccharides such as those listed above by Ponpipom et al., or by those listed by Dahmen et al. who lists multiple solvents that other disaccharides are soluble in such as ethyl acetate (col 13, line 67) or solvent systems such as isooctane/ethyl acetate (col 14, line 42) for use in Soxhlet extraction. Again it would be a matter of routine optimization by the artisan to select solvents known in the art that dissolved saccharides (see M.P.E.P. § 2144.05 (II)) for Soxhlet extraction and absent any evidence to the criticality of solvent selection for the extraction or teaching of an unexpected result, one of ordinary skill in the art would have a reasonable expectation of success.

The amount of solvent used to elute the disaccharide from celite is also a matter of routine optimization by one of skill in the art. The volume of solvent to remove the

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disaccharide would depend on the size of the celite particles, the purity of the solvent and the temperature of the solvent and the amount of disaccharide absorbed on the celite.

Also a matter of routine optimization is the amount of celite to use in the extraction of the disaccharide. One of ordinary skill in the art would recognize that overloading the column would not accomplish the goal of purifying the disaccharide. Therefore this artisan would know the loading parameters of the celite or carbon-celite used in the experiment. He/she would also recognize that the loading amount of celite necessary for the purification would depend on the size and surface area of the celite particles. The skilled artisan would recognize that he/she must use the necessary amount of celite to purify the disaccharide base on the prospective yield. Larger reaction batches would require larger amounts of celite.

Claims 11 and 15 limit that the carbon in the activated carbon-celite column must be deactivated with HCl. One of ordinary skill in the art would recognize that the procedure for deactivating the column is a matter or routine optimization that would depend on the amount of the activated carbon in the column and the size of the column and recommendations from the manufacture. It would also be dependant on the size and surface area of the carbon particles since this would determine how many theoretical plates were available for the adsorption and separation of the disaccharide.

In response to the applicant's traversal of the 35 U.S.C § 103 rejection of amended claims 25 and 26 over Reyes et al (U.S. Patent # 5, 994, 092) in view of

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Ponpipom et al. (U.S. Patent # 4, 228,274), Crumpton et al. ( Biochem J. 70(4) 1958, page 729), Dahmen et al. (U.S. Patent # 4,675,392), Rao et al. (Qual. Plant-Pl.Fds.hum. Nutr. XXVIII, 4: 1979, page 293) and Wong-Madden et al. (U.S. Patent # 5,770,405) in further view of Gabelsberger et al (FEMS Letters, 109(2-3), page 131, 1993), Fujimoto et al. (Glycogonjugate Journal 15, page 155, 1998) and Yoshitake et al.(Eur. J. Biochem. 101, page 395, 1979) the Applicant's arguments were considered but not found persuasive.

The Applicant refers to the previous arguments made in their response that have been addressed above and provides no further argument. However, the previous arguments were found not persuasive and in the absence of new arguments here, remain not persuasive for claims 25 and 26. Therefore the rejection stands and is repeated below.

Therefore the following rejection is upheld and is repeated here. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 25 and 26 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Reyes et al (U.S. Patent # 5, 994, 092) in view of Ponpipom et al. (U.S. Patent # 4, 228,274), Crumpton et al. ( Biochem J. 70(4) 1958, page 729), Dahmen et al. (U.S.



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Patent # 4,675,392), Rao et al. (Qual. Plant-Pl.Fds.hum. Nutr. XXVIII, 4: 1979, page 293) and Wong-Madden et al. (U.S. Patent # 5,770,405) in further view of Gabelsberger et al (FEMS Letters, 109(2-3), page 131, 1993), Fujimoto et al. (Glycogonjugate Journal 15, page 155, 1998) and Yoshitake et al.(Eur. J. Biochem. 101, page 395, 1979).

These claims are drawn to the addition of cosolvents DMF, DMSO and dioxane to the reaction medium in the method of claim 1.

Reyes et al. and references listed above teach the method of claim 1 from which 25 and 26 depend. Reyes et al. teach the use of a phosphate buffer as the reaction solution but not with a cosolvent. However three other references that involve reactions using  $\beta$ -galactosidase use DMF (Fujimoto et al., page 157, col 1, 1<sup>st</sup> and 3<sup>rd</sup> paragraphs), DMSO (Gabelsberger et al. page 133, col 1, 1<sup>st</sup> paragraph) and dioxane (Yoshitake et al., page 396, col 2 line 1) in the formulation of their phosphate buffer. All three of these reactions use the organic solvent/phosphate buffer system successfully with  $\beta$ -galactosidase to hydrolyze a substrate. It would have been obvious to someone skilled in the art to use either of the three solvents in the phosphate buffer in the method of Reyes et al. Since all three share the same goal of Reyes of hydrolyzing a substrate with  $\beta$ -galactosidase. Each provides a reasonable expectation of success since each accomplishes the hydrolysis of their substrate using their phosphate buffer cosolvent.

The amount of the cosolvent ranges from 20% in Fujimoto et al. to 2% in Yoshitake et al. One of ordinary skill in the art would recognize that the amount of DMSO is an optimizable parameter and that the amount of solvent in the phosphate buffer would depend on the amount of enzymes in the solution along with the solubility

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tolerance of the substrate in the buffer as the co-solvent increases or decreases.

Therefore claim 26 is rendered obvious since one of ordinary skill in the art would meet the limitation through routine optimization of the co-solvent in the reaction mixture.

Therefore the references listed above renders obvious claims 25 and 26.

In summary no claims, as written, are allowed for this application.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

**In response to this office action the applicant should specifically point out the support for any amendments made to the disclosure**, including the claims (MPEP 714.02 and 2163.06). Due to the procedure outlined in MPEP § 2163.06 for interpreting claims, it is noted that other art may be applicable under 35 U.S.C. § 102 or 35 U.S.C. § 103(a) once the aforementioned issue(s) is/are addressed.

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Applicant is requested to provide a list of all copending U.S. applications that set forth similar subject matter to the present claims. A copy of such copending claims is requested in response to this Office action.

#### CONTACT INFORMATION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thane Underdahl whose telephone number is (571) 272-9042. The examiner can normally be reached Monday through Thursday, 8:00 to 17:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Wityshyn can be reached at (571) 272-0926. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Leon B Lankford/

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Primary Examiner, Art Unit 1651